

AD-A235 970



ICATION PAGE

DTIC FILE COPY

2

OMB No. 0704-0188

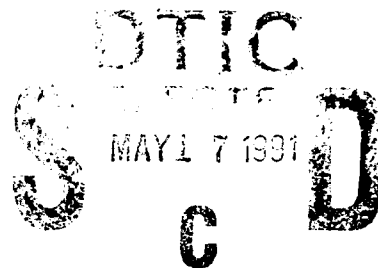
ed to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, viewing the collection of information. Send comments regarding this burden estimate or any other aspect of this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 05/07/91		3. REPORT TYPE AND DATES COVERED POP Test (12/90)	
4. TITLE AND SUBTITLE Performance Oriented Packaging Testing of Mk 14 Mod 3 and Mk 15 Mod 0 Cartridge Tanks for Packing Group II Solid Hazardous Materials				5. FUNDING NUMBERS	
6. AUTHOR(S) Fred Haggard					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Weapons Station Earle Colts Neck, NJ 07722-5000				8. PERFORMING ORGANIZATION REPORT NUMBER DODPOPHM/USA/DOD NADTR91005	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Naval Weapons Support Center Crane, IN 47522-5000				10. SPONSORING/MONITORING AGENCY REPORT NUMBER Same as above	
11. SUPPLEMENTARY NOTES N/A					
12a. DISTRIBUTION / AVAILABILITY STATEMENT				12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) <p>Qualification tests were performed to determine whether the in-service Mk 14 Mod 3 Cartridge Tank could be utilized to contain properly dunnaged solid type hazardous materials weighing up to a gross weight of 18.6 kg (41 pounds). The tests were conducted in accordance with Performance Oriented Packaging (POP) requirements specified by the United Nations Recommendations on the Transportation of Dangerous Goods and the Department of Transportation's Title 49 CFR and the Final Rulings published in the Federal Register, Vol. 55 on 21 Dec 90. The tank has conformed to the POP performance requirements; i.e., the tank successfully retained its contents throughout the specified tests.</p> <p>In addition, due to their similarities in size and weight, this test is considered representative of qualification testing for the Mk 15 Mod 0 Cartridge Tanks as per the variation in the Federal Register (21 Feb 91) and page 52724, para 178.601h of the Final Rulings specified in the Department of Transportation's Performance Oriented Packaging Standards in the Federal Register, Vol. 55.</p>					
14. SUBJECT TERMS POP Test of Mk 14 Mod 3 and Mk 15 Mod 0 Cartridge Tanks				15. NUMBER OF PAGES 8	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UL	19. SECURITY CLASSIFICATION OF ABSTRACT UL	20. LIMITATION OF ABSTRACT UL		

DODPOPHM/USA/DOD/NADTR91005

**PERFORMANCE ORIENTED PACKAGING TESTING
OF
MK 14 MOD 3 AND MK 15 MOD 0 CARTRIDGE TANKS
FOR
PACKING GROUP II
SOLID HAZARDOUS MATERIALS**

Author:
Fred Haggar
Mechanical Engineer



Performing Activity:
Naval Weapons Station Earle
Colts Neck, New Jersey 07722-5000

7 May 1991



FINAL

DISTRIBUTION UNLIMITED

Sponsoring Organization:
Naval Weapons Support Center
Crane, Indiana 47522-5000

Accession For	
DTIC DATA	
DTIC FOR	
Unrestricted	
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

91 5 16 013

91-00024



INTRODUCTION

The Mk 14 Mod 3 Cartridge Tank tested, contained a simulated load of 41 pounds of sand. Overall weight of the tank was 46 pounds. This Performance Oriented Packaging (POP) test was performed to ascertain whether this standard container (Packing Group II) would meet the requirements as specified by the United Nations Recommendation on the Transportation of Dangerous Goods Document, ST/SG/AC.10/1, Revision 6, Chapters 4 and 9, and Federal Register 49 CFR Final Rule. A base level vibration test was also conducted in accordance with the final rulings specified in the Department of Transportation's Performance Oriented Packaging Standards in the Federal Register Volume 55.

The objective of these tests was to ensure that the sample container could withstand conditions of transportation outlined by the UN requirements. The test is representative of the worst case loading of the Mk 14 Mod 3 Cartridge Tank.

In addition, due to their similarities in size and weight, this test is considered representative of qualification testing for the Mk 15 Mod 0 Cartridge Tanks as per the variation in the Federal Register (21 February 1991) and page 52724, paragraph 178.601h of the Final Rulings specified in the Department of Transportation's Performance Oriented Packaging Standards in the Federal Register, Volume 55.

TESTS PERFORMED

1. Drop Test

This test was performed in accordance with ST/SG/AC.10/1, chapter 9, paragraph 9.7.3. Six tanks were used as required. The drops were performed from a height of 4 feet in the following orientations (three tanks for each orientation):

- a. Horizontally. (See figure 1.)
- b. Diagonally on the edge between the cover assembly and the top ring of the tank. (See figure 2.)

This test was performed at an ambient temperature, 70 ± 20 °F.

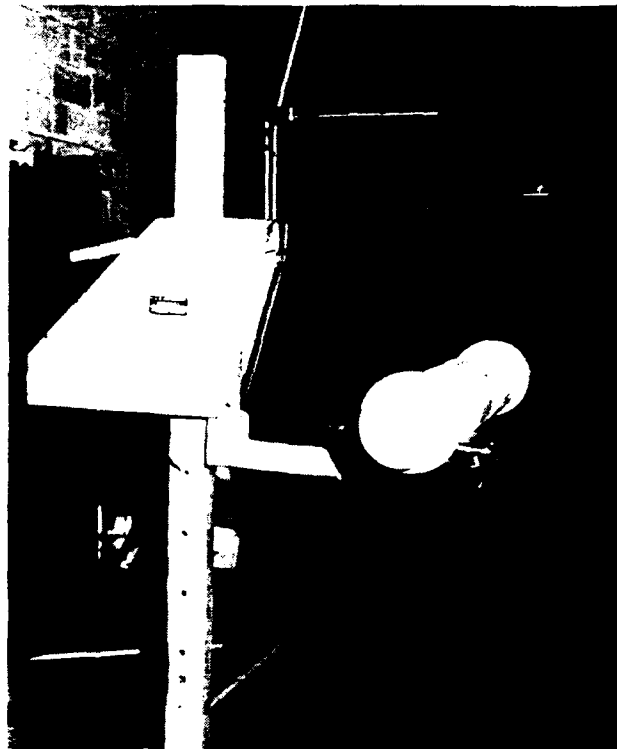


FIGURE 1
Horizontal Drop Test



FIGURE 2
Diagonal Drop Test

2. Base Level Vibration Test

This test was performed in accordance with paragraph 178.608 of the Performance Oriented Packaging Standards, Final Ruling, published in the Federal Register, Vol. 55, No. 246, December 21, 1990. The three sample tanks used for the horizontal drop tests were placed on the repetitive shock. The tanks were restrained during vibration in all but the vertical direction. The frequency of the platform was increased until the tank left the platform 1/16 of an inch at some instant during each cycle. Test time was 1 hour at a frequency of 4.17 Hz.

3. Stacking Test

This test was performed in accordance with ST/SG/AC.10/1, chapter 9, paragraph 9.7.6. The three tanks used for the diagonal drop tests were used for this test. Each tank was subjected to a force applied to its top surface equivalent to the total weight of identical packages stacked to a height of 3 meters (including the test samples). A combined weight of 2,140 pounds was stacked on the three tanks (713 pounds/tank). The test was performed for 24 hours. After the allowed time, the weight was removed and the tanks examined.

PASS/FAIL (UN CRITERIA)

1. Drop Test (UN CRITERIA)

The criteria for passing the drop test is outlined in paragraph 9.7.3.5 of ST/SG/AC.10/1 and states the following: "Where a packaging for solids undergoes a drop test and its upper face strikes the target, the test sample passes the test if the entire contents are retained by an inner packaging or inner receptacle; e.g., a plastic bag, even if the closure is no longer sift-proof. A slight discharge from the closure(s) upon impact should not be considered to be a failure of the packaging provided that no further leakage occurs."

2. Base Level Vibration Test (FINAL RULING CRITERIA)

The criteria for passing the base level vibration test is outlined in paragraph 178.608 of the Title 49 CFR Final Ruling and states the following: "immediately following the period of vibration, each package shall be removed from the platform, turned on its side and observed for any evidence of leakage. Rupture or leakage from any of the packages constitutes failure of the test."

3. Stacking Test (UN CRITERIA)

The criteria for passing the stacking test is outlined in paragraph 9.7.6.3 of ST/SG/AC.10/1 and states the following: "... no test sample should leak. No test sample should show any deterioration which could adversely affect transport safety or any distortion liable to reduce its strength or cause instability in stacks of packages."

TEST RESULTS

1. Drop Test

Satisfactory.

2. Base Level Vibration Test

Satisfactory.

3. Stacking Test

Satisfactory.

DISCUSSION

1. Drop Test

After each drop, the tanks were inspected for any damage which would be a cause for rejection. The inspection after the horizontal drops indicated there was a cracked weld between the sleeve and the body of the tank, but no leakage was found. No leakage was found after the diagonal drops. The tanks remained intact and functional upon completion of the tests.

2. Base Level Vibration Test

Immediately after the vibration test was completed, each tank was removed from the platform, turned on its side and observed for any evidence of leakage. There was no leakage to the tanks as a result of this test.

3. Stacking Test

Each tank was visibly checked after the 24-hour period was over. There was no leakage, distortion, or deterioration to any of the tanks as a result of this test.

REFERENCE MATERIAL

A. United Nation's "Recommendation on the Transportation of Dangerous Goods," ST/SG/AC.10/1, Revision 6

B. Title 49 CFR 107, et al., Performance Oriented Packaging Standard; Changes to Classification, Hazard Communication, Packaging and Handling Requirements Based on UN Standards and Agency Initiative; Final Rule, Federal Register, Vol. 55, No. 246 of December 21, 1990

DISTRIBUTION LIST

Defense Technical Information Center (2 copies)

ATTN: DTIC/FDA

Bldg. 5, Cameron Station

Alexandria, VA 22304-6145

Headquarters, Military Traffic Management Command (2 copies)

ATTN: MT-SS, James Gibson

5611 Columbia Pike

Falls Church, VA 22041-5050

TEST DATA SHEET

DATA SHEET:	
Container: Mk 14 Mod 3 Cartridge Tank	
Type: 1B2	Container P/N or NSN: NSN 8140-00-135-2866
Specification Number: MIL-STD-1323-5, DL 2127977	Material: Aluminum
Capacity: 20.9 kg (46 pounds)	Dimensions: 7.47" D x 36.33" L
Closure (Method/Type): Removable Cover	Tare Weight: 4.1 kg (5 pounds)
Additional Description:	
PRODUCT: See table	
Name: See table	NSN(s): See table
United Nations Number: See table	
United Nations Packing Group: II	
Physical State (Solid, Liquid, or Gas): Solid	
Vapor Pressure (Liquids Only): N/A At 50 C: N/A At 55 C: N/A	
Consistency/Viscosity: N/A Density/Specific Gravity: N/A	
Amount Per Container: See table Flash Point: N/A	
Net Weight: See table	
TEST PRODUCT: Simulated Weights of Sand	
Name: Sand	Physical State: Solid
Consistency: N/A	
Density/Specific Gravity: N/A	
Test Pressure (Liquids Only): N/A	
Amount Per Container: N/A	Gross Weight: 18.6 kg (41 pounds)

TABLE 1

Mk 14 Mod 3 Cartridge Tank

NALC	NSN	Type	Packing Drawing	UN Code	UN Number	#/ Cntr	Weight (lb)
D297	1320-01-060-1118	Prop Chg Mk 68-2	2127977	1.2C	0328	1	27.0
D326	1320-01-004-1082	Prop Chg Full, Mk 67-3	2127977	1.2C	0242	1	41.0

Mk 15 Mod 0 Cartridge Tank

NALC	NSN	Type	Packing Drawing	UN Code	UN Number	#/ Cntr	Weight (lb)
D282	1320-00-039-2058 (Non-Flashless)	Chg, Prop, 5"/38 Cal Full	423033		0242		28.6
	1320-01-157-2494 (Non-Flashless)	Chg, Prop, 5"/38 Cal Full					
D274	1320-00-039-2037	Chg, Prop, 5"/38 Cal Full	423033		0242		41.2
	1320-00-103-4930 (Flashless)	Chg, Prop, 5"/38 Cal Full					
	1320-00-174-8174 (Flashless)	Chg, Prop, 5"/38 Cal Full					
	1320-00-009-0351 (Flashless)	Chg, Prop, 5"/38 Cal Full Mk 63 Mod 1					
D272	1320-00-039-1971 (Non-Flashless)	Chg, Prop, 5"/38 Cal Full	423033		0242		40.2
	1320-00-457-2577 (Non-Flashless)	Chg, Prop, 5"/38 Cal Full Mk 63 Mod 1					
	1320-00-557-0928 (Non-Flashless)	Chg, Prop, 5"/38 Cal Full					
	1320-00-557-0931 (Non-Flashless)	Chg, Prop, 5"/38 Cal Full Mk 63 Mod 2					

TABLE 1

Mk 15 Mod 0 Cartridge Tank (Continued)

NALC	NSN	Type	Packing Drawing	UN Code	UN Number	#/ Cntr	Weight (lb)
D264	1320-00-411-8606 (Universal)	Chg. Prop, 5"/38 Cal Full	423033		0242		40.2
	1320-00-871-3723 (Universal)	Chg. Prop, 5"/38 Cal Full Mk 63 Mod 0					
D227	1320-00-039-1949 (Flashless)	Chg. Prop, 5"/38 Cal Clearing	423033		0327		35.5
	1320-00-039-1961 (Flashless)	Chg. Prop, 5"/38 Cal Short					
D296	1320-00-313-2461 (Universal)	Chg. Prop, 5"/38/54 Cal Clearing Mk 65 Mod 0	423033		0327		38.6
	1320-01-056-2826 (Universal)	Chg. Prop, 5"/38/54 Cal Clearing Mk 65 Mod 1					

**MK 14 MOD 3 CARTRIDGE TANK &
MK 15 MOD 1 CARTRIDGE TANK
POP MARKING**

UN 1B2/Y18/S//USA/DOD/NAD**

**** YEAR MANUFACTURED OR LAST PACKED**

Enclosure 2